



DEPARTMENT OF TRANSPORTATION

MATERIALS TRANSPORTATION BUREAU

WASHINGTON, D.C. 20590

46050

[49 CFR Part 172]

[Docket No. HM-141]

COLOR CODING OF COMPRESSED GAS PACKAGES

Termination of Docket

AGENCY: Materials Transportation Bureau, Research and Special Programs Administration, DOT.

ACTION: Termination of docket HM-141.

SUMMARY: Docket HM-141 is closed without issuance of a final rule. The advance notice of proposed rulemaking, establishing docket HM-141, requested information from the public to develop a system of color coding for compressed gas packages and to substantiate whether any such color coding system would significantly enhance safety. Upon additional analysis and consideration of comments received, the Materials Transportation Bureau has concluded that further consideration of color coding of compressed gas packages is not justified.

EFFECTIVE DATE: Docket HM-141 is terminated on October 5, 1978.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION: An advance notice of proposed rulemaking (41 FR 43188, Sept. 30, 1976) was published by the Materials Transportation Bureau (MTB) in response to requests and to bills considered by both Houses of Congress in the past several years seeking the establishment of a system of color codes for compressed gas packages. The purpose of a color code would be to provide safety for any person within the sphere of hazard surrounding a compressed gas package, whether the package is in transportation, use, or storage, by facilitating ready identification of the gas contained in the package.

Most commenters objected to the concept of a color code system because:

(1) Some degree of color blindness affects a significant segment of the population (variously described as 10 percent to 15 percent of the working population).

(2) The great multiplicity of gases and the almost infinite number of mixtures (sometimes including up to five different gases) would require a complex color code system.

(3) The complexity of such a system would require a reference source that would be unwieldy in size and possibly of limited usefulness.

(4) The continual development of new mixtures would require frequent updating of the reference source.

(5) The variable appearance of color pigments under different light sources, and the possible fading of pigments, might result in substantial confusion.

(6) The many years of transition, while older compressed gas packages of varying color combinations are emptied and returned to a source for filling and application of a new color code, would be a major source of confusion.

(7) Labels, placards and/or markings already provide identification of each gas by means of color, symbol and text.

Comments from organizations and individuals associated with the delivery of health care services questioned the value of modifying existing medical gas color codes even though medical gases constitute only a small part of the total number of gases and gas mixtures in use at the present time. The American Association for Respiratory Therapy addressed color coding as being probably the least important mechanism for safe handling of compressed gases.

The National Society for the Prevention of Blindness, Inc., strongly disagreed with the premise that any color code system would enhance safety for personnel involved in loading, handling or storage. This society viewed color codes as impractical and possibly dangerous.

Various military organizations suggested use of a number of standards dependent on the intended use of compressed gas packages, such as diving, medical, or general application. These commenters did not address fire fighting or emergency response uses of compressed gases. However, MTB notes that the color red is widely used at present to identify fire extinguishers that may contain any of a number of different gases, such as carbon dioxide, nitrogen, or various refrigerant gases.

Few comments were received from persons concerned with fire protection. The Fire Equipment Manufacturers' Association, Inc., requested to be excluded from any color code system that might be established. The association was concerned with the cosmetic and esthetic acceptance of portable fire extinguishers in both the workplace and the home. Further, the association remarked that for industrial use, a color coding system already is employed to identify certain agents for special fire application. This system was not explained further.

The Florida State Fire Marshal's Office limited comment to liquefied petroleum gas transportations safety and stated that changing the color of packagings used to transport this material could lead to confusion with resultant danger to the public. Similarly, the California Division of Industrial Safety suggested that extending the use of a color code system to shipping containers would confuse people accustomed to differing color code systems in use within their workplace. The Safety Department of the University of Wisconsin further supported this view by stating that color markings would be more detrimental than advantageous and cannot be substituted in any conceivable way for a label.

The docket also includes a letter from the Deputy Assistant Secretary of the Department of Labor (DOL) to a Member of the House of Representatives relating to color code legislation. The letter explains that with the advent of many sophisticated mixtures of exotic gases, color coding alone became too complex to assure the necessary recognition of hazards. A vendor's catalog is cited as containing a list of over 200 gas mixtures, including a mixture of carbon monoxide, helium, oxygen, argon, and nitrogen. The letter also states that the Occupational Safety and Health Administration is working with the Department of Transportation and a number of other Federal agencies in an attempt to standardize labeling requirements, including the use of color, symbol and legend. (The MTB published new standards for labeling requirements including the use of color, symbol and legend on April 15, 1976 (41 FR 15972), docket HM-103/112. The DOL currently has this and other standards under consideration.)

The MTB wrote the DOL, on October 15, 1976, requesting statistics on deaths or injuries involving compressed gas cylinders where the cause of death or injury was the injured or deceased's lack of knowledge as to the gas contained in the cylinders. The DOL injury data system is based on investigations where one fatality, or five hospital admissions occur. In subsequent communication, MTB was informed that no such deaths or injuries had been reported.

The single accident situation cited by the primary and virtually single proponent of the color coding concept occurred on his company's premises in 1955 and involved a compressor test in which oxygen was inadvertently used rather than an inert gas. In his statement, he suggests the infrequency of such accidents by saying, "The amazing thing to us is that we can find no case so far where this type of accident has occurred in the past." Similarly, the MTB has not found one case that has occurred since. While the proponent has stated that "we know of no safety precautions we could have taken, except an actual analysis of all gases, which could have prevented this disaster," the facts as presented by the proponent indicate that insufficient planning had led to an exhaustion of suitable supplies of gases to be used for the tests. To hasten delivery of the needed gas the company made an uncustomary pickup rather than waiting for delivery by fully trained personnel. This can be considered the primary causal factor in the unfortunate incident. The proponent stated September 14, 1955, that "we (the company) are taking every possible step to make certain that such substitution cannot occur again." The MTB notes that the precautions taken by the proponent's company have been successful in the subsequent 23 years, which suggests that color coding is not necessary to prevent death and injury.

The proponent of the color code

system maintains that only six colors are specified by MIL-STD-101B. However, the DOD lists 115 various color combinations of four or more colors, representing only a small number of the gas mixtures possible. The coding of cylinders in the six basic colors referred to may adequately prevent the particular kind of accident referred to by the proponent, but it would not prevent the inadvertent mixture of gases within a grouping that could lead to adverse reactions in a laboratory or industrial environment. As pointed out earlier in this document, commenters indicate that even the military does not have only one color code system, but several systems patterned for specific uses.

The staff conclusions of the MTB on the major economic and public safety issues involved in the adoption of a uniform, nationwide color code system for compressed gas cylinders are quoted below:

A uniform, nation-wide system of color coding compressed gas cylinders as a means of preventing serious cylinder accidents in the normal, routine environment characterizing the workplace or households is felt to be of little or marginal value as a safety measure; and the adoption of such a system may increase, rather than decrease, serious accidents involving such cylinders.

The costs of adopting a uniform, nationwide system of color coding compressed gas cylinders would not be negligible. With an estimated 110 million cylinders in existence, and a unit conversion cost of \$1 to cover such expenses as conversion of current workplace procedures, new safety training requirements, the development of new owner identification systems, sandblasting and repainting cylinders, and so forth—the cost of the new system could easily exceed \$110 million. When viewed against the expected marginal benefits to be derived from it, the color coding system does not appear to be the most cost-effective way to improve the public safety associated with the transportation, handling and storage of compressed gas cylinders.

The use of color code systems for cylin-

ders in emergency response situations where rapid reaction time is of vital importance, save life or limb (as in hospitals, or in the military) does have an obvious and demonstrated value. However, a color code system for the purpose of improving emergency response/reaction times involving (after-the-fact) transportation accidents is of less obvious value, since cylinders are usually stored or packed together in a manner that allows only a few cylinders to be taken in at a glance; and since shipping paper requirements provide a much more rapid means for identifying cargo content.

The complete staff summary of "The Economic and Public Safety Implications of a Uniform Nationwide Color Code System for Compressed Gas Cylinders," is available for public review in the Dockets Branch, Office of Program Support, Materials Transportation Bureau, Department of Transportation, Washington, D.C. 20590. Primary drafters of this document are Paul H. Seay, Technical Division, and Douglas A. Crockett, Standards Division, Office of Hazardous Materials Regulation, MTB.

Based on the comments received, and the conclusions reached, docket HM-141 is hereby terminated without further action.

(49 U.S.C. 1803, 1804, 1808, 49 CFR 1.53(e) and paragraph (a)(4) of app. A. to part 101)

NOTE.—The Materials Transportation Bureau has determined that this notice will not have a major economic impact under the terms of Executive Order 12044 and DOT implementing procedures (43 FR 9582).

Issued in Washington, D.C., on September 27, 1978.

ALAN I. ROBERTS,
Associate Director for Hazardous Materials Regulations,
Materials Transportation Bureau.

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